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Identifiers-Wepman Test of Auditory Discrimination

A study was conducted to examine the effects of word familiarity on auditory discrimination and the interactions of the familiarity variable with age. Thirty-seven word pairs equated in sound and length and 37 nonsense word pairs similarly equated were selected according to the maturational level at which children learn different sounds. The subjects were selected from two economically deprived schools and one nondeprived school located in a semirural district in Tennessee. Fourteen first- and second-grade pupils were chosen randomly from each school and were grouped into two sections. One section was given the word pairs first and the nonsense words second, while the other section was presented the pairs in the opposite order. Analyses of variance and T-tests were used to analyze data. It was concluded (1) that second-grade children performed better on the auditory discrimination task than first graders, (2) that meaningfulness of stimulus influenced auditory discrimination, suggesting that an expanded auditory vocabulary might account for apparently improved auditory discrimination skills, (3) that sex was not a significant factor, and (4) that the socioeconomic level bore no significant influence. A bibliography is included. (WL)

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The Effect of Meaning on the Measurement
of the Ability to Auditorially Discriminate
Sounds Contained in Words*

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Related Research

Many important studies made during the last forty years have examined the relationship between auditory discrimination and the skills of reading, spelling, and speech. Relatively few of these have concerned themselves with word meaning familiarity and its relationship to discrimination ability, which is a major purpose of this investigation. Some of the more pertinent studies are the following:

Monroe (12) initially explored the role of auditory discrimination in a large sampling of young school children. She used her own Diagnostic Reading Examination as a measure which includes a word discrimination

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test of 20 word pairs presented by the reading and responded to as "same" or "different". Munson (10) stated that lack of auditory acuity due to partial deafness, lack of precision in the discrimination of speech sounds, and of the temporal sequence of sounds may impede progress in reading. This was later verified by Schonell (16) and Vernon (19). In other studies, Bond (1), Kennedy (11), Ewers (6), and Johnson (2) all found positive relationships between ability in auditory discrimination and reading ability.

Russell (14) compared the auditory abilities of 97 first, second, and third grade pupils with their achievement in spelling. Six tests of auditory discrimination were given. Russell concluded: "In general, the results suggest that rather complex auditory abilities involving sound recognition in various parts of a word are more closely related to spelling ability than is recognition of sounds of whole words as in 'same'-'different' or 'rhyming tests'."

Hepman (21) designed the Auditory Discrimination Test utilizing 40 pairs of like or unlike words equated for familiarity and length. He tested 145 children in the first three grades and found a positive correlation between auditory discrimination and intelligence.

In the area of speech discrimination tasks, Templin, in 1942, studied the sound discrimination ability of children in second through sixth grades using 200 items similar to those in the Travis-Rasmus Test (18) but vowels were not included. Later, Templin (17) shortened the test to 50 pairs of nonsense syllables for use with 120 subjects from six to eight years of age. Eight pairs were like and 42 were unlike. All of

the sounds were consonants, consonant blends, or diphthongs. Among the findings were no statistically significant differences in the sound discrimination ability of boys and girls at any age level. Subjects from the upper socioeconomic status groups received higher sound discrimination scores than subjects from lower socioeconomic status groups at each age level, but these differences were not always statistically significant. Winitz (25) in a study of 150 five-year-old children, found no significant differences in language and articulation skills between males and females.

Some studies of auditory discrimination indicate that there is a maturational factor related to the development of this ability. Watts (20) stated that the majority of children of six and one-half years are capable of differentiating between the sounds of short words which are nearly alike. Myklebust (13) suggested that full maturity of auditory ability occurs around seven years of age. A maturational factor in the development of auditory discrimination was explored by Schiefelbusch and Lindsey (15). They found second grade children superior over first grade children in discriminating rhymes, initial sounds, and final sounds. Bradford (2), in a study of spelling readiness among first and second grade pupils, concluded that the ability to discriminate speech sounds is a developmental skill. Wepman (23) tested 156 first and second grade children with the Wepman Auditory Discrimination Test and stated that there is a developmental nature to the process of discrimination.

Christine and Christine (4) used the Wepman Auditory Discrimination Test with children who were good readers from grades one, two, and three;

primary grade children reading below grade level, and a group of children with functional articulation difficulties. It was concluded that faulty auditory discrimination is a causative factor in both reading retardation and functional articulatory problems among children in the primary grades. Wilson (24) used the Wepman Test and compared auditory discrimination in 120 bright, average, and dull children ages six to nine whose IQ's ranged from 63-136. She concluded that brighter and older children are better in auditory discrimination than duller and younger children. Clark and Richard (5) assessed auditory discrimination ability in economically disadvantaged and non-disadvantaged preschool children using the Wepman Test. They concluded that preschool economically disadvantaged children exhibit significant deficiencies in auditory discrimination ability when compared to a non-disadvantaged group. There appeared to be no relationship between sex and errors.

Hutton and Weaver (8) wondered whether word intelligibility was associated with word familiarity. The 15 least familiar and 15 most familiar words of the Phonetically Balanced W-22 list, Hirsch et al (7), were presented to a group of 53 public school children from kindergarten to twelfth grades. Words were pronounced at random by the examiner, the listener repeated the word, and the response was recorded. It was concluded that the meaning of a word, as seen in familiarity, does affect recognition as well as auditory discrimination. Budoff and Quinlan (3) tested 56 second grade children from non-professional homes. Meaningful stimulus words were presented visually and orally. It was concluded that the word pairs presented orally were learned sooner and more easily

than the visually presented pairs. Katz (10) used the Wepman Auditory Discrimination Test with 72 normal and retarded readers in grades two, four, and six. The subjects were Negro males from lower socioeconomic backgrounds. English and Hebrew word pairs were used in both visual and auditory discrimination tasks. It was found that perceptual skills and stimulus familiarity factors play a role in children's visual and auditory discrimination performance.

From the foregoing studies, it may be concluded that:

1. Lack of auditory ability may impede progress in reading and be a causative factor in reading disability.
2. Faulty auditory discrimination is a causative factor in functional articulatory problems among children in the primary grades.
3. Auditory abilities of sounds in various parts of a word are more related to spelling than recognition of sounds of whole words.
4. There is a correlation between auditory discrimination and intelligence with brighter children being better in auditory discrimination than duller children.
5. There is a developmental or maturational factor related to auditory discrimination skills.
6. There are no statistically significant differences in the sound discrimination ability of boys and girls.
7. Economically disadvantaged children exhibit more deficiencies in auditory discrimination ability than non-disadvantaged children.
8. The meaning of a word does affect recognition as well as auditory discrimination.

Purpose

The purpose of this study was to examine the effect of word familiarity on auditory discrimination and the interactions of the familiarity variable with age.

Description of Instruments

Because of its widespread clinical use, the Wepman Test of Auditory Discrimination was chosen as a model for this study. The Wepman Test consists of 40 word pairs, equated for sound and length, selected and matched for familiarity from the Lorge-Thorndike Teacher's Word Book of 30,000 Words (1944). The test measures only the ability to discriminate accurately between word pairs, some of which are the "same" and some of which are "different". A test-retest reliability of +.91 (N=109) was reported in the manual.

This study has replicated the same sounds as Wepman in both word pairs and nonsense word pairs. Because word familiarity was a major consideration, only words found in lists AA, A, or below 20 rating were selected from Lorge-Thorndike's Teacher's Word Book of 30,000 Words. Thirty-seven word pairs were equated in sound and length with 37 nonsense word pairs, such as: "rub-rug", "fub-fug", and "pass-path", "dass-dath", etc. Sounds were matched according to the maturational level at which a child learns the sound. For example "d" and "b" are acquired at one age level, while "k" and "p" are acquired at a later age level in normal speech development, Wellman et al (21). None of the nonsense word pairs were found in Webster's New World Dictionary of the American Language and, therefore, were considered to be non-meaningful.

tapes by a qualified speech therapist. Simple directions with three examples each of word and nonsense pairs were given, and the time between each test pair was equally spaced. The child was asked to respond verbally, "same" or "different" to all the pairs.

Procedure

First, schools which represented economically deprived and nondeprived populations were selected from a semirural school system in middle Tennessee. The criteria for judging the deprived and nondeprived populations consisted of the opinions of system supervisory personnel and whether or not a school qualified for substantial funds under Title I of the Elementary and Secondary Education Act of 1966. Because of the size of first and second grade populations, it was necessary to select two deprived schools and one nondeprived. The next step was to randomly select fourteen pupils to represent each of the variables. Table 1 illustrates the resulting groups.

In order to examine the effects of order of presentation, a counter-balanced experimental procedure was used. Each of the groups represented in Figure 1 was randomly divided into two groups of seven and these groups were randomly assigned to differing orders of presentation. One group was given the words first, immediately followed by the nonsense words. The other group was given the nonsense words first, immediately followed by the words. In each instance, the stimulus was presented on identical audio tapes and responses recorded by a graduate student who had been given special training in the procedure to be used in this study.

Results

Data was analyzed by an analysis of variance computer program. The program was designed to handle repeated measures on the same subjects.

The first analysis resulted in two significant main effects F ratios, grade (age) and words; and two significant side effects F ratio words/order, and words/age/order (See Table 2). The mean for number of responses correct on words and nonsense words combined for grade two children ($\bar{X}=31.4$) was significantly higher than for grade one children ($\bar{X}=28.7$). The mean number of correct responses on the words ($\bar{X}=31.8$) was significantly higher than the mean of correct responses on nonsense words ($\bar{X}=28.3$).

The first analysis of variance was followed by two simple analyses of variance. In the latter analysis, grade one and grade two were treated separately (See Tables 3 & 4). As expected, the mean number of right responses on the words exceeded that on the nonsense words. Also, there was a significant interaction between words--nonsense and order of presentation.

In order to examine the significant interaction results, t tests were used. From Table 5 it is noted that in grade one all results were significant except in the instance where words were given first and nonsense given second. One conclusion, then, is that order is a significant variable. In both relative comparisons the children performed in a superior fashion on the stimuli which were given second. Words-second were superior to words-first and nonse-second were superior to nonsense-first.

However, in general, the influence of the order of presentation variable was not strong enough to overcome the influence of the meaning (word) over the nonsense variable. In all comparisons except one, the subjects responded correctly to more words than they did to nonsense words.

The results for second grade were not greatly different from those for first grade (see Table 6). Again, the subjects got higher scores on words than they did on the nonsense words. However, while the order variable showed a significant influence on the nonsense words, it was not significant for the words. It may be that there was insufficient ceiling on the word task and that for this reason order had no significant effect on the subject's performance on the word tasks.

Conclusions

From these results, it was concluded that:

1. Second grade children performed better on this auditory discrimination task than did first grade children.
2. The meaningfulness of the stimulus greatly influences the auditory discrimination performance of the child. Thus, when one uses a pre and post auditory discrimination measure, a significant improvement might occur as a result of improved auditory discrimination or as a result of an expanded auditory vocabulary.
3. Sex was not a significant factor in this auditory discrimination task. Boys and girls performed equally well on the testing instruments.

4. The socio-economic level of the two groups did not significantly influence their performance on this measure. In fact the nondeprived population had a mean score of only 1.2 correct responses higher than that of the deprived population. In light of other studies, this result is very surprising to the experimenters and it is hoped this experiment will be replicated in order to confirm this unpredicted result.

Table 1. Experimental Groups

	<u>Deprived</u>		<u>Non-Deprived</u>	
	<u>First Grade</u>	<u>Second Grade</u>	<u>First Grade</u>	<u>Second Grade</u>
Boys	14	14	14	14
Girls	14	14	14	14

Table 2. Complex Analysis of Variance Comparisons

Source	Sum of Squares	df	F-Ratio
S	83.790	1	2.456
A	388.500	1	11.390*
X	45.540	1	1.335
O	6.790	1	
SA	0.760	1	
SX	4.860	1	
SO	14.500	1	
AX	53.040	1	1.555
AO	3.760	1	
XO	0.220	1	
SAX	67.540	1	1.980
SAO	10.710	1	
AXO	107.250	1	3.144
SXO	0.040	1	
SAXO	32.260	1	
Error (SBS/GRPS)	3274.580	96	
W	696.540	1	86.202*
WS	4.290	1	
WA	1.610	1	
WX	2.360	1	
WO	378.040	1	46.785*
WSA	15.540	1	1.923
WSX	23.790	1	2.944
WSO	2.360	1	
WAX	0.220	1	
WAO	33.790	1	4.182*
WXO	0.110	1	
WSAX	30.760	1	3.807
WSAO	1.300	1	
WAXO	2.790	1	
WSXO	0.050	1	
WSAXO	3.240	1	
Error (SBS/WSAXO)	775.710	96	

*Significant at or beyond .05 level

S=Socio-economic status
A=Age
X=Sex
O=Order
SBS=Subjects
GRPS=Groups
W=Words

Table 3. Simple Analysis of Variance for Grade One

Source	Sum of Squares	df	F-Ratio
O	0.233	1	
Error (SBS/O)	2360.697	54	
Words Vs. Nonsense	382.580	1	42.510*
O/W	318.938	1	35.439*
Error (WXSBS/O)	485.932	54	9.000
Total	3548.420	111	

*Significant at or beyond .05 level.

O = Order
SBS = Subjects
X = Sex
W = Words

Table 4. Simple Analysis of Variance for Grade Two

Source	Sum of Squares	df	F-Ratio
O	10.320	1	
Error (SBS/O)	1334.400	54	
Words Vs. Nonsense	315.570	1	45.297*
O/W	92.900	1	13.323*
Error (WXSBS/O)	376.520	54	
Total	2129.720	111	

*Significant at or beyond .05 level.

O = Order
SBS = Subjects
X = Sex
W = Words

Table 5. Results of t tests for Grade One

Comparison	Mean	t^*
Words - first	23.929	4.096
Words - second	32.214	
Nonsense - first	25.143	4.319
Nonsense - second	23.607	
Words - first	23.929	4.721
Nonsense - first	25.143	
Words - second	22.214	4.493
Nonsense - second	23.607	
Words - first	23.929	.402
Nonsense - second	23.607	
Words - second	32.214	
Nonsense - first	25.143	8.817

*Using 50 df, the t value at the .01 level is 2.63 and at the .05 level is 2.01.

Table 6. Results of t Tests for Grade Two

Words - first	32.429	1.720
Words - second	33.643	
Nonsense - first	28.464	3.441
Nonsense - second	30.893	
Words - first	32.429	5.616
Nonsense - first	28.464	
Words - second	33.643	3.893
Nonsense - second	30.893	
Words - first	32.429	2.176
Nonsense - second	30.893	
Words - Second	33.643	7.336
Nonsense - first	28.464	

*Using 50 df, the t value at the .01 level is 2.68, and at the .05 level is 2.01.

References

1. Bond, Guy L. "The Auditory and Speech Characteristics of Poor Readers," Teachers College Contribution to Education, 1935, No. 587.
2. Bradford, H.F. "Oral-Aural Differentiation Among Basic Speech Sounds as a Factor in Spelling Readiness," Elementary School Journal, 1954, 54, 351-355.
3. Budoff, M. and Quinlan, D., "Auditory and Visual Learning in Primary Grade Children," Child Development, 1964, 35, 583-588.
4. Christine, Dorothy, and Christie, Charles. "The Relationship of Auditory Discrimination to Articulatory Defects and Reading Retardation," Elementary School Journal, 1964, 65, 97-100.
5. Clark, Ann D. and Richards, Charlotte J. "Auditory Discrimination Among Economically Disadvantaged and Non-disadvantaged Preschool Children," Exceptional Children, 1966, 33, 259-262.
6. Ewers, Dorothea W.F. "Relations Between Auditory Ability and Reading Abilities: a Problem in Psychometrics," Journal of Experimental Education, 1950, 18, 239-62.
7. Hirsch, Ira J. et al. "Development of Materials for Speech Audiology," Journal of Speech and Hearing Disorders, 1952, 17, 321-337.
8. Hutten, C. and Weaver, J. "F3 Intelligibility and Word Familiarity," Language, 1959, 69, 1443-1451.
9. Johnson, M.S. "Factors Related to Difficulty in Reading," Journal of Experimental Education, 1957, 26, 1-26.
10. Katz, Phyllis A. "Verbal Discrimination Performance of Disadvantaged Children: Stimulus and Subject Variables," Child Development, 1967, 38, 233-242.
11. Kennedy, Helen. "A Study of Children's Hearing as it Relates to Reading," Journal of Experimental Education, 1942, 10, 216-251.
12. Monroe, Marian. Children Who Can't Read. Chicago: University of Chicago Press, 1932.
13. Myklebust, B.R. The Psychology of Reading. New York: Grune and Stratton, 1957.
14. Russell, D.N. "Auditory Abilities and Achievement in Spelling," Journal of Educational Psychology, 1968, 49, 311-319.

15. Schiefelbusch, R.L. and Lindsay, Mary J. "A New Test of Sound Discrimination," Journal of Speech and Hearing Disorders, 1958, 23, 153-159.
16. Schonell, F.J. Backwardness in Reading: a Study of its Nature and Causes. London: Oliver and Boyd, 1942.
17. Teaplin, Mildred C. Certain Language Skills in Children: Their Development and Interrelationships. Minneapolis: University of Minnesota Press, 1951.
18. Travis, L.E. and Ramus, Brenda. "The Speech Sound Discrimination Ability of Cases with Functional Disorders of Articulation," Quarterly Journal of Speech, 1950, 37, 217-225.
19. Vernon, M.D. Backwardness in Reading: a Study of its Nature and Causes. London: Cambridge University Press, 1957.
20. Watts, A.F. The Language and Mental Development of Children. London: George G. Harney, 1944.
21. Wallman, Beth L. et al. "Speech Sounds of Young Children," University of Iowa Studies in Child Welfare, 1951, 5(2), 7-32.
22. Wepman, J.M. Auditory Discrimination Test: Manual of Directions. Chicago: Language Research Associates, 1958.
23. Wepman, J. "Auditory Discrimination, Speech, and Reading," Alexander's School Journal, 1960, 60, 325-333.
24. Wilson, Marguerite E. "Auditory Discrimination in Bright, Average, and Dull Children," Doctor of Education Dissertation, George Peabody College for Teachers, 1965.
25. Winitz, H. "Language Skills of Male and Female Kindergarten Children," Journal of Speech and Hearing Research, 1957, 2, 377-383.